MONTANA FISH WILDLIFE & PARKS
HUNTING SEASON / QUOTA CHANGE SUPPORTING INFORMATION

Species: Bobcat
Region: 3
Hunting District: Trapping District 3
Year: 2018

1. Describe the proposed season / quota change and provide a summary of prior history (i.e. prior history of permits, season types, etc.)

The proposed change from the current bobcat season is to decrease the existing Trapping District (TD) 3 bobcat quota **from 250 to 150** for the 2018-2019 season.

In 1996 the bobcat quota was raised from 100 to 125 animals. This quota remained at 125 for 5 years and then increased to 175. This quota was further increased to 200 in 2003, to 225 in 2004, to 300 for the 2005 and 2006 seasons and then to a quota of 325 bobcats in 2007 (Table 1).

After two years with a quota of 325 we started to identify some signals that made us believe a quota was too high and the population appeared vulnerable to overharvest. Total bobcat harvest was down, it was the first time the quota had not been filled since 1995, and we observed a declining harvest rate (number of bobcats harvested per day) (Figure 1). We also observed the one of the lowest juvenile to adult ratios since 1995 (possibly indicating poor production/kitten survival), in combination with anecdotal observations of low prey numbers. In response to these signals we reduced the quota from 325 to 200 for the 2009-2010 season. We believed that the proposed reduction was large enough to allow biologists to observe a measurable change if it occurred, and we suggested that the quota change remain in place for several years to allow effects to be detected.

The two years following the quota reduction (2009 and 2010 seasons), harvest data indicated the population was recovering; the quota was met in both years, the harvest rate was increasing, and the ratio of juveniles to adults also increased. To provide more trapper opportunity the quota was raised to 250 bobcats for the 2011-2012 season.

The per trapper limit in District 3 was reduced from 7 to 5 in the 2004 trapping season, the purpose was to spread the harvest out among more bobcat trappers and increase the effective length of the season. By spreading the harvest out among more trappers, we were also trying to accommodate the recreational trapper interest.

In summary, the quotas have been reduced when trend data showed negative responses and incrementally raised when harvest trend data indicate positive population responses. Quotas and per trapper limits have also been adjusted through consideration of social and environmental factors.

Table 1. Summary of Trapping District 3 bobcat quota and harvest parameters. The line depicts the reduction in per trapper limit from 7 to 5.

License Year*	Bobcat Quota	Trapper Quota	# of Bobcats Harvested	Bobcat Season Length	Harvest Rate Bobcats / Day
94-95	100	7	118	37 days	3.19
95-96	100	7	103	47 days	2.19
96-97	125	7	135	43 days	3.21
97-98	125	7	144	41 days	3.05
98-99	125	7	140	52 days	2.71
99-00	125	7	149	51 days	2.61
00-01	125	7	130	49 days	2.51
01-02	175	7	171	38 days	4.47
02-03	175	7	206	33 days	5.97
03-04	200	7	236	20 days	11.35
04-05	225	5	219	18 days	12.11
05-06	300	5	292	35 days	8.31
06-07	300	5	298	31 days	9.48
07-08	325	5	324	52 days	6.04
08-09	325	5	292	77 days	3.78
09-10	200	5	203	53 days	3.81
10-11	200	5	216	37 days	5.84
11-12	250	5	275	28 days	9.79
12-13	250	5	273	30 days	9.10
13-14	250	5	271	29 days	9.31
14-15	250	5	241	32 days	7.50
15-16	250	5	257	44 days	5.84
16-17	250	5	237	40 days	5.93
17-18	250	5	248	47 days	5.28
3-YEAR AVERAGE			247	44	5.7
10- YEAR AVERAGE			251	42	6.6

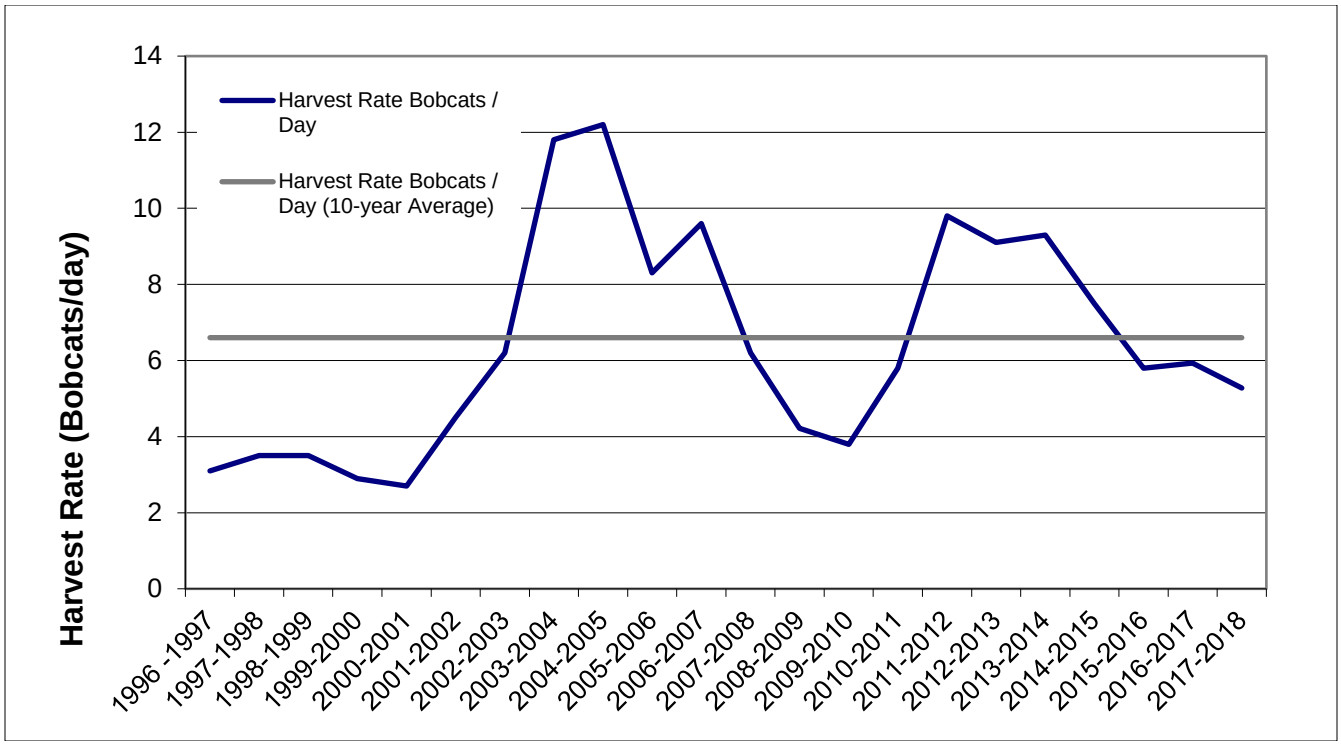

Figure 1. Bobcat harvest rate (bobcats/day), in TD 3 showing 10-year average.

2. Why is the proposed change necessary?

The quota has remained at 250 since 2011-2012. The years immediately following the quota increase to 250 bobcats, the TD 3 bobcat population showed no sign of being vulnerable to overharvest, conversely, the population parameters reflected a population that was stable or growing. From harvest data we were comfortable that we had identified the upper and lower limits of the quota and that a quota of 250 represented a balance between trapper opportunity and sustainable harvest. But, population parameters from the past several years of bobcat harvest data have started to indicate the opposite and that the population may be vulnerable to overharvest if the current quota of 250 is retained. More specifically, the concern is that a relatively high quota in combination with an indication that juvenile survival is declining, could result in a larger and longer decline in the population than necessary unless the quota is reduced.

3. What is the current population's status in relation to the management objectives? (i.e., state management objectives from management plan if applicable; provide current and prior years of population survey, harvest, or other pertinent information.

The management objective for TD 3 is to maintain healthy populations of bobcats while still allowing for a sustainable harvest, to provide trapper opportunities, and increase trapper participation.

Statewide we have an extensive amount of data from harvested bobcats which is used to derive a Scaled Population Estimate (SPE) to estimate bobcat population numbers and trend in each trapping district by using population reconstruction from tooth age data (Draft bobcat population reconstruction, habitat, and

harvest management report 2018). For the period 2000-2016, 4,168 harvested bobcats were used in the reconstruction of populations in TD 3. Trends in adult populations, exhibited with scaled population estimates, showed adult populations increasing between 2000 and 2007 and then declining from 2007 through 2013. The estimated adult population in 2013 was 18% below the long-term average (Table 2 and Figure 2). The reconstructed SPE for the adult population showed a further decline in 2014 followed by stability or higher than average population in 2015-2016. The predicted population estimate using the significant relationship between harvest rate (bobcats/day) and adult population the following year, shows relative stability over the same period (Figure 2).

Table 2. Trapping district 3 scaled population estimates, 2000-2016.

	SPE		
Year	Juvenile	Adults≥1.5	Total
2000	220	870	1090
2001	307	832	1138
2002	378	835	1212
2003	408	856	1264
2004	399	900	1298
2005	402	971	1373
2006	395	954	1349
2007	348	990	1338
2008	287	935	1223
2009	356	854	1210
2010	365	909	1274
2011	307	925	1231
2012	206	854	1060
2013	210	727	937
2014	*350*	*588*	*938*
2015	*707*	*693*	*1400*
2016	*316*	*1046*	*1362*
Avg.[1]	351	867	1217

[1]Average is for the years 2000 through 2016.

Year in italics have the greatest chance of changing with new information but are still population estimates based on reconstruction and the assumptions of the reconstruction model.

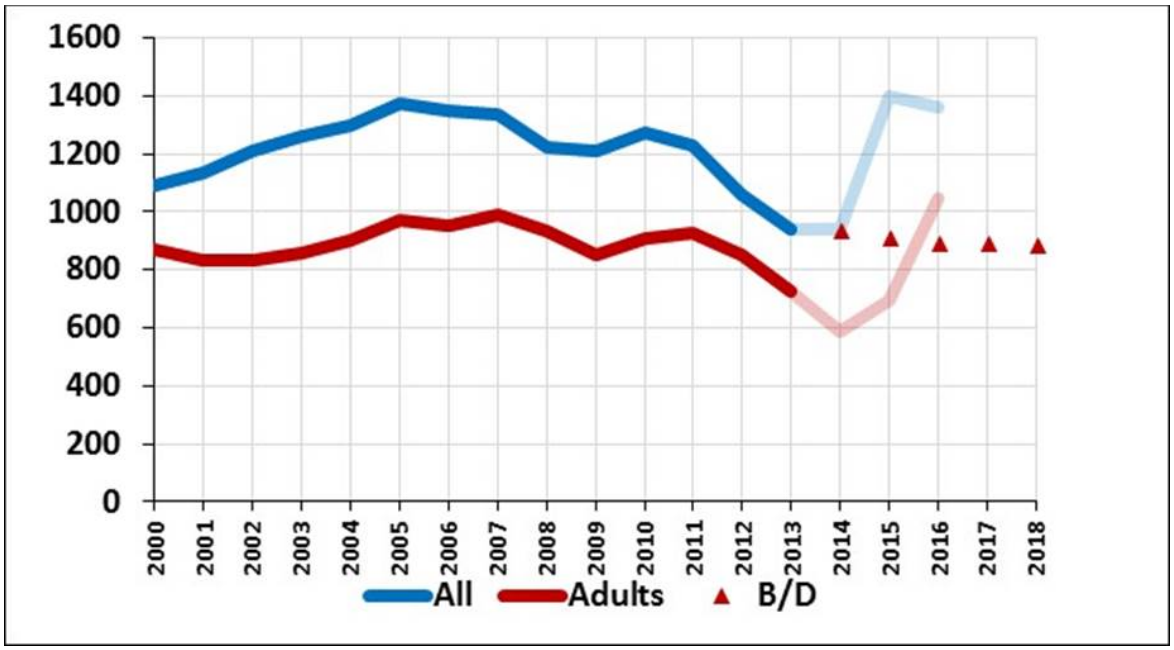

Figure 2. Annual scaled population estimates of adult and total bobcats TD 3, 2000-2013. This shows the reconstructed population demonstrating uncertainty in latter years with the predictions from bobcat per day for the adult population.

However, because of the way backdated populations are calculated, the population estimates fluctuate more the closer you get to the current year. To account for the uncertainly in these most recent years, and because age data from 2017 is not yet available, traditional harvest metrics are used to describe population trends in the most recent years (described below). We therefore use both the SPE and the traditional harvest metrics such as harvest rate (bobcats/day) and juvenile to adult ratio to set quota levels and manage bobcat populations accordingly. Because no one parameter can provide enough information to be conclusive, a variety of biological parameters are used in combination with trapping statistics and environmental and social factors to collectively assess the status/trajectory of the population.

Using traditional harvest metrics, harvest rate (number of bobcats taken per day) provides some indication of population abundance. A high harvest rate reflects a robust growing population, a low bobcat harvest rate implies the reverse. While the predicted population from the reconstructed data showed stable populations in recent years (Figure 2), the traditional harvest metric indicates that this is below the 10-year average and is steadily declining. (Table 1 and Figure 1).

The age analysis of bobcat harvest data allows for the separation of juveniles (0.5 years) to the adults' category (1.5 years and older). These data provide valuable insights into the age structure, and consequently the health/projected trend of the population (Table 3). The juvenile to adult metric is a crude measure of production and recruitment; assuming kittens are not released, we assume that a lot of juveniles in the harvest represents a lot of young animals on the landscape and therefore a growing population. Few juveniles in the harvest may indicate a low number of young animals on the landscape. In 2015-2016 we saw an increase in this metric followed by a precipitous decline thereafter. In 2017-2018 this ratio was the lowest on record and substantially below the 10-year average (Figure 3). While

it is rather unclear what the detrimental threshold is for bobcat populations, there is a strong concern in TD 3 that the poor juvenile to adult ratio, poor kitten survival and thus poor recruitment could lead to a reduced population overall.

Table 3. Age Structure and biological harvest parameters of bobcats trapped in Trapping District 3, 1995 to 2017 (Age data for 2017-2018 currently unavailable) (percentages are based on the total of the classified/aged individuals)

LICENSE YEAR	TOTAL HRVST	% JUV	JUV/ADULT
95-96	103	13.5%	0.15
96-97	135	28.3%	0.40
97-98	144	17.6%	0.20
98-99	140	36.4%	0.57
99-00	149	21.8%	0.29
00-01	130	16.4%	0.16
01-02	171	23.8%	0.29
02-03	206	23.1%	0.30
03-04	236	24.3%	0.33
04-05	219	20.7%	0.25
05-06	292	18.7%	0.25
06-07	298	21.5%	0.27
07-08	324	25.6%	0.34
08-09	292	15.3%	0.17
09-10	203	20.4%	0.24
10-11	216	30.6%	0.44
11-12	275	25.5%	0.34
12-13	273	23.3%	0.30
13-14	271	22.5%	0.29
14-15	241	20.3%	0.26
15-16	257	34.4%	0.53
16-17	237	20.8%	0.26
17-18	248	10.9%	0.13
3-YR AVG		22.0%	0.31
10-YR AVG		22.1%	0.29

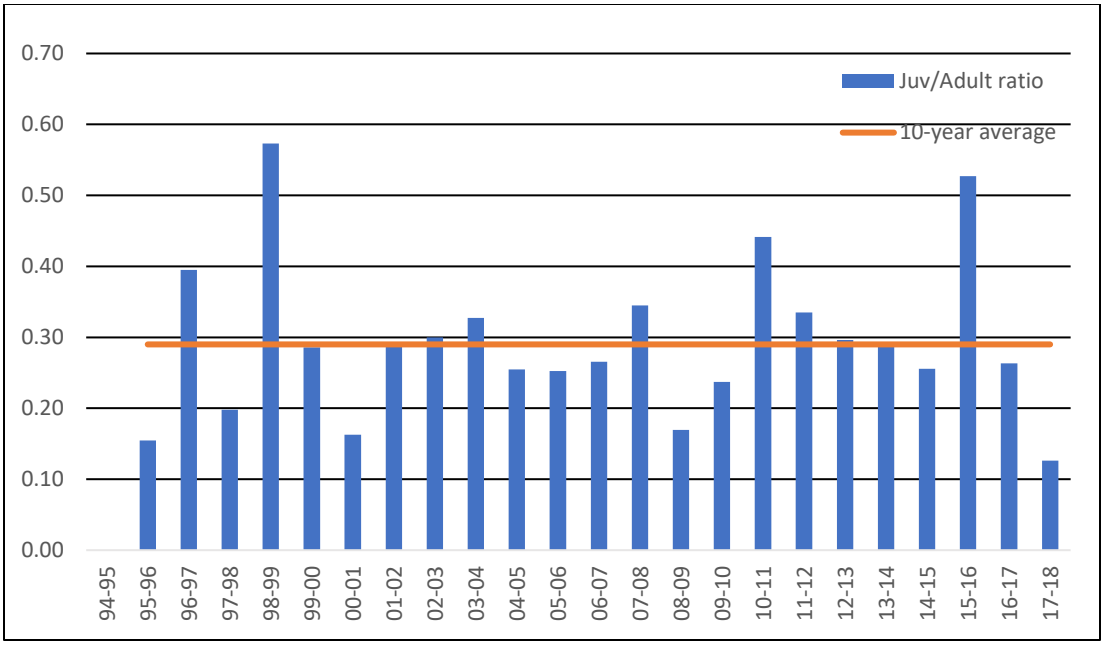

Figure 3. Ratio of juvenile / adult bobcat in TD 3 showing the 10-year average.

Summary:

As stated above, we use both the SPE and the traditional harvest metrics such as harvest rate (bobcats/day) and juvenile to adult ratio to set quota levels and manage bobcat populations. Because no one parameter can provide enough information to be conclusive, a variety of biological parameters are used in combination with trapping statistics and environmental and social factors to collectively assess the status/trajectory of the population. While reconstruction data indicates that the population is stable, these data demonstrate uncertainty in the latter years. Therefore, to be additionally prudent, we glean further insight from traditional metrics for these current years. In this case the traditional metrics are not showing positive trends and are highly suggestive that the population has the potential for being overharvested, especially with the low juvenile to adult ratio. Trappers have expressed anecdotally low numbers of bobcats and low prey abundance and have expressed concern that a continual collapse in prey could continue to affect next years kittens. The concern is that a relatively high quota in combination with poor juvenile survival could result in a larger and longer decline in the population than necessary. In combination with the concerns of trappers we believe that it would be prudent to reduce the quota for the 2018-2019 season and proactively manage to prevent for an unnecessary decline.

We are anticipating that the population will respond favorably to a quota reduction as shown by previous reductions in TD 3. We believe that the proposed reduction is large enough to allow biologists to observe a measurable change if it occurs, and we suggest that any quota changes remain in place for several years to allow effects to be detected.

4. Provide information related to any weather / habitat factors that have relevance to this change (i.e. habitat security, hunter access, vegetation surveys, weather index, snow conditions, temperature / precipitation information).

While no data are currently used to assess rabbit numbers, anecdotal observations from trappers and biologists would suggest that lagomorph numbers, especially cottontails, are low, particularly this past fall/winter. Also, anecdotally we had elevated reports of dead rabbits killed by tularemia in SW Montana in 2016-2017. Low prey numbers may have affected kitten survival and consequently the extremely low number of juveniles in the 2017-2018 harvest. Some trappers at the Montana Trappers Association (MTA) spring meeting in District 3 on April 14th, 2018 were concerned that they have been seeing less bobcats overall, some had talked with area biologists and proposed the change, others agreed that they would like to see the quota reduced.

5. Briefly describe the contacts you have made with individual sportsmen or landowners, public groups or organizations regarding this proposal and indicate their comments (both pro and con).

Area biologists have discussed the proposed change with individual trappers. The proposed plan to reduce the bobcat harvest quota by 100 animals was discussed at the Montana Trappers Association (MTA) spring meeting in District 3. Some trappers were concerned that they have been seeing less bobcats overall and would like to see the quota reduced. Trappers supported the proposal.

Submitted by: Claire Gower

Date: 5/14/2018

Approved (Wildlife Manager/date): Howard Burt

Approved (Regional supervisor / date):

Disapproved / modified by: Name / date):

Reason for modification: